AN ROINN OIDEACHAIS.

(Department of Education).

BRAINNSE AN MHEADHON-OIDEACHAIS

(Secondary Education Branch).

INTERMEDIATE CERTIFICATE EXAMINATION, 1941.

SCIENCE (Syllabus D).

THURSDAY, 19th JUNE.—AFTERNOON, 4 TO 6 P.M.

[Not more than *six* questions to be attempted of which *three* must be taken from Section I, and *three* from Section II. Illustrate your answers wherever possible. All questions are of equal value.]

SECTION I.

1. Describe how you would measure as accurately as possible each of the following :—

(*a*) the volume of a cork ;

(*b*) the capacity of a bottle in spoonfuls ;

(*c*) the number of cubic centimetres in a spoonful.

2. What is a lever ?

State the principle on which its operation is based. Show, with the aid of diagrams, how the principle is applied in the operation of each of the following appliances :—(*a*) a scissors, (*b*) a nut-cracker, (*c*) a sugar tongs.

The position of the fulcrum and the positions and directions of the forces should be shown clearly on the diagrams.

3. Write a brief account of two experiments to show that the atmosphere exerts a pressure and describe fully how you would measure the pressure of the atmosphere.

Why does the pressure of the atmosphere change from time to time ?

4. Explain each of the following :—

(*a*) a vessel made of thick glass cracks when boiling water is poured into it ;

(*b*) pieces of iron feel colder than pieces of wood in the same room ;

(*c*) the flame of a paraffin lamp smokes until the globe is placed in position ;

(*d*) moisture is often seen on the inside of train windows ;

(*e*) during the night ice sometimes forms on puddles although the temperature of the air is above the freezing point.

5. Mention two units in which temperature is measured and show how the relationship between them may be established.

Describe, with the aid of a diagram, a clinical thermometer and state how it is used. Explain why boiling water should not be used to sterilize it.

6. How do (*a*) changes in pressure, (*b*) dissolved solids affect the boiling point of water ? What other properties of water are affected by dissolved solids ? Describe experiments to support your answer in the case of (*a*) above.

Section II.

7. What products are obtained when (*a*) carbon, (*b*) hydrogen are burned in air ? Mention their properties. Describe, briefly, the experiments you would perform to show that during respiration the same products are formed as when a candle burns in the air.

8. Describe, with the aid of a diagram, how you would prepare and collect oxygen.

What is noticed when (*a*) sulphur, (*b*) sodium, (*c*) iron, (*d*) phosphorus, (*e*) magnesium are burned in jars of the gas ?

Name the product formed in each case and state whether it is soluble in water or not.

9. Define the following terms :—acid, alkali, salt. If you were given a solution in water of each of the following : (*a*) washing soda, (*b*) common salt, (*c*) tartaric acid, (*d*) soap, describe the tests you would perform to distinguish between them.

What would happen if solution (*c*) were poured into solution (*a*), and solution (*b*) into solution (*d*) ?

10. Describe, with the aid of a diagram, the walls of the thoracic cavity and explain the part played by them in the operation of breathing.

State how you would perform artificial respiration and explain your method.

11. Draw a diagram showing the shape and position in the body of each of the following :—(*a*) the pancreas, (*b*) the liver, (*c*) the small intestine. Describe, briefly, the chief functions of each.

12. What is (*a*) the average rate of breathing, (*b*) the average rate of heart-beat of a healthy person sitting at ease.

Describe how you would measure those rates and explain the changes which they undergo during exercise.

Why is suitable exercise conducive to good health ?